Talking Points for Nat Pitts re S&T Workforce
Plenary 2 – Human Capacity Building

We are grateful to Korea for developing this issue and articulating a very thoughtful and comprehensive discussion paper. At the National Science Foundation we have three strategic goals that guide all of our programmatic decisions: People, Ideas, and Tools. Investment in high-tech equipment is no good without the brain power. Building the human capacity is critical to the future of research and innovation in science and engineering.

Research and training are intertwined, since the typical NSF research project involves faculty members working with their graduate students and postdocs. To promote the integration of research and education and increase the educational impact of NSF funding, many NSF program solicitations specify that the research proposal must include an education component.

Science and math education from K-12 through baccalaureate is the pipeline for preparing graduate students to work in research institutions and teachers to teach math and science to the next generation. NSF is supporting innovations in math and science teaching, to leverage the native curiosity of children in the early grades and to keep them interested in the middle and high school years. Beyond the formal curriculum, NSF is creating more opportunities for teachers and students at the high school and undergraduate level to experience for themselves the excitement and rewards of actually doing research.

In 2001, NSF established the annual Director's Award for Distinguished Teaching Scholars as a way of giving visibility to the integration of research and education at the undergraduate level. In addition to the public recognition of the award ceremony and citation, the grant provides resources for the educators to continue their work and encourage them to mentor other faculty. Another goal is to promote an academic culture that values and rewards members of the academic community who contribute to both disciplinary scholarship and the education of undergraduates, including students majoring in non-scientific disciplines.

In the U.S. we are acutely conscious that we have untapped human resources that could enlarge and strengthen our nation’s science, math, and engineering workforce. NSF-funded data gathering and research are helping us to understand the conditions that constrain the fuller participation of women and underrepresented minorities in scientific and technical fields, and NSF has designed programs that attempt to address these constraints. One such program, ADVANCE, addresses the issue on several

levels. One component of ADVANCE offers support to promising individual women to establish or re-establish full time independent academic research and education careers. Another component supports institutions to transform their systems to increase the participation and advancement of women, including women from underrepresented minority groups. The intent of the ADVANCE program is to catalyze a change in the academic culture.

If our economies want to fully utilize the talents of one-half of our populations, we must address the issue of career flexibility. Women are far more likely, at some point in their careers, to find themselves having to relocate, or work part-time, or temporarily suspend professional activities altogether. Although often unavoidable, these interruptions are a barrier to career development and advancement. Not only does this situation diminish the potential contribution of the individual to the research enterprise. It also has a wider negative impact: fewer women rise to senior positions where they can serve as mentors and role models to younger women, and seeing the barriers gives women and girls a disincentive to pursue careers in science and engineering.

Lifelong learning: With the pace of technological change, young people being trained today must be prepared to upgrade their skills and knowledge and master new tools and techniques throughout their working lives. Thus, academic institutions and enterprises alike must provide systems and facilities for continuous, lifelong learning, on the job and alongside the job. New technologies can facilitate greatly. Consider that a generation ago, distance learning meant correspondence courses conducted by postal mail. Today we have the Internet, interactive software, streaming video. [NEED BETTER EXAMPLES]

The economy and the S&T enterprise of the 21st century are global. The leaders of the S&T workforce of the 21st century must be globally oriented. NSF is increasing its programs to give young researchers opportunities to do research at sites and institutions abroad, and to work with peers and mentors from other countries. We support international research experiences for students at all levels, from undergraduates to graduate students, to dissertation research, to postdoctoral fellows. Through cooperative arrangements with the host economy, each summer we support the Graduate Research Summer Institutes. This summer, U.S. students will be going to labs in Japan, Korea, China, Chinese Taipei, and Australia.

In addition to training the S&T workforce, human capacity building includes educating the general public. Science museums, television programs, and other informal channels are a valuable resource for reaching not only the young, but also adults outside the S&T community. A great many questions of public policy today, at the local, national, and international level hinge on scientific findings or interpretations. A public that is scientifically literate is able to reach informed judgments about such issues and candidates' positions. Government funding for the

research endeavor rests on the support of the public for budgetary allocations. Ultimately, strong science programs in the schools that nurture scientific talent depend on support from the public.